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# Peer Assessment in Architecture Education

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The role of peer assessment in education has become of particular interest in recent years, mainly because of its potential benefits in improving student's learning [1] and benefits in time management by allowing teachers and tutors to use their time more efficiently to get the results of student's assessments quicker [2]. Peer assessment has also relevant in the context of distance learning and massive open online courses (MOOCs) [3]. These education systems have scalability problems in the cost of evaluating students and new strategies are being researched to lower the cost of evaluating many students. In this context peer assessment is very important because it is scalable. For each new student we get one new marker for the system and efforts are being made to differentiate between good and poor markers [4]. Although these efforts are oriented towards objective learning subjects, peer assessment can also be applied in the context of subjective fields, like architecture, painting or music, where it has an intrinsic pedagogic value as a formative activity.

The discipline of architecture is dominated by an artistic language that has its own way of being discussed and applied. The architecture project analysis and criticism goes beyond the technical components and programme requirements that need to be fulfilled. Dominating the architecture language is an essential tool in the architect's toolbox. The establishment of a method of 'doing architecture' in the student's early learning years is a slow process. It is impossible to reduce the architecture practice to one dimensional aspect and therefore it is of utmost importance for students to develop a critical thinking process about the architecture design process [5]. In this context peer assessment activities can help them develop skills early in their undergraduate education.

In this work we show how peer assessment acts as a formative activity in architecture teaching. Peer assessment leads the students to develop critical and higher order thinking processes that are fundamental for the analysis of architecture projects [2, 6]. The applicability of this strategy to massive open online education systems has to be considered as the heterogeneous and unsupervised environment requires confidence in the usefulness of this approach. To study this we designed a local experiment to investigate the role of peer experiment in architecture teaching.

In our experiment we have 45 students from two professors of the architecture programme of the Lisbon University Institute. The two classes belong to the course *Architecture IV* (4th semester in the undergraduate programme). This course is mainly practical with classes taking place in an architecture office environment. The peer assessment activities were made during two distinct time periods. The first peer assessment session was held midway the semester and the marking occurred only among classmates. The second peer assessment activity occurred at the end of semester simultaneously with the student's final examinations. This time students assessed each other's work irrespective of their class. In both phases each student assessed three other randomly chosen students.

The assessment was divided in a qualitative part and a quantitative mark. Each student was asked to identify the positive aspects of the assessed project and also to identify its flaws and future improvements. They also marked the overall project with a score based on the achievements of the project against the programme of the exercise proposed for the semester.

This experiment showed that students reacted positively to the peer assessment exercise and looked forward to participating when it was announced. Previously to the assessment students felt engaged by the responsibility of marking their colleagues. Subsequently to the first iteration of the peer assessment, professors registered that students used elements of the qualitative assessment in their architecture discourse, and tried to answer the criticisms pointed to their projects by their colleagues. This led their work in directions some hadn't consider before.

The quality of the peer assessment process was very high and through textual inspection of the student's answers the professors concluded that the limited space available for the qualitative aspects forced students to synthesise and develop a critical thought process. Globally the comments made by the students were very assertive but in some cases they show that some students still didn't possess an architecture discourse capable of communicating in architectural terms. The peer assessment was very useful in identifying such cases.

The quantitative marks awarded by the students in the second peer marking period are in good agreement with the final scores awarded by the professors. Only in 5 cases the average score of the peer assessment differed more than 10% from marks given by the professors. This represents less than 12% of the students. It was also observed that the professor's marks were slightly higher than the average of the peer marking. No correlation was observed between the marks given by a student as marker and the final score given to that student by the professors. This seems to imply that a good marker doesn't necessarily need to be a good student.

The data produced in this experiment shows peer assessment as a feedback mechanism in the construction of a critical thought process and in the development of an architectural discourse. Also it shows that students tend to mark their colleagues with great accuracy. Both of these results are of great importance for possible application of peer assessment strategies to massive open online courses and distance education.

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